

1 CLAIMS

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3 What is claimed is:

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- 5 1. A method comprising:
- 6 receiving file system data;
- 7 storing the file system data in a plurality of reserved sectors within a non-
- 8 volatile memory;
- 9 compressing the file system data stored within in the plurality of reserved
- 10 sectors to create a compressed data block; and
- 11 storing the compressed data block in at least one physical subsector within
- 12 the non-volatile memory.
- 13
- 14 2. The method as recited in Claim 1, wherein receiving file system data
- 15 further includes presenting an operating system with a plurality of operatively
- 16 accessible virtual sectors resulting in a virtual memory capacity that exceeds the
- 17 actual physical capacity of the non-volatile memory.
- 18
- 19 3. The method as recited in Claim 2, wherein storing the compressed data
- 20 block at least one physical subsector within the non-volatile memory further
- 21 includes mapping the plurality of virtual sectors to at least one physical subsector
- 22 through a Virtual Sector Table (VST) stored in a volatile memory and presenting
- 23 the operating system with the VST.
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1 4. The method as recited in Claim 3, wherein mapping the plurality of virtual
2 sectors to at least one physical subsector through the Virtual Sector Table (VST)
3 further includes providing a Sector Allocation Table (SAT) within the volatile
4 memory, the SAT mapping the physical subsectors to the VST.

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6 5. The method as recited in Claim 4, wherein providing a Sector Allocation
7 Table (SAT) within the volatile memory further includes generating the SAT based
8 at least on a unique group identifier that is stored in each physical subsector
9 associated with storing the compressed data block.

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11 6. The method as recited in Claim 5, wherein the Sector Allocation Table
12 (SAT) is generated during a device initialization time.

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14 7. The method as recited in Claim 1, wherein storing the compressed data
15 block in at least one physical subsector within the non-volatile memory further
16 includes associating each physical subsector with a unique group identifier.

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18 8. The method as recited in Claim 7, wherein storing the compressed data
19 block in at least one physical subsector within the non-volatile memory further
20 includes writing each physical subsector associated with the compressed data
21 block to the non-volatile memory in an a sequential order, but not necessarily a
22 contiguous order.

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1 9. The method as recited in Claim 1, wherein storing the compressed data
2 block in at least one physical subsector within the non-volatile memory further
3 includes associating a first physical subsector with at least one virtual sector
4 identifier.

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6 10. The method as recited in Claim 1, wherein storing the compressed data
7 block in at least one physical subsector within the non-volatile memory further
8 includes, maintaining input/output (I/O) operation status information within the
9 non-volatile memory during on-going I/O operations.

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11 11. The method as recited in Claim 1, wherein the non-volatile memory further
12 includes a raw sector map configured to identify a plurality of reserved sectors
13 within the non-volatile memory.

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15 12. The method as recited in Claim 11, wherein the non-volatile memory
16 further includes an input/output (I/O) operation status area that identifies the status
17 of on-going I/O operations with respect to data stored within non-volatile memory.

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19 13. The method as recited in Claim 11, wherein the non-volatile memory
20 further includes a plurality of contiguously arranged reserved sectors.

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22 14. The method as recited in Claim 11, wherein the non-volatile memory
23 further includes a plurality of contiguously arranged physical subsectors.

1 15. The method as recited in Claim 14, wherein each of the physical subsectors
2 includes a first portion that includes a group identifier.

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4 16. The method as recited in Claim 14, wherein the group identifier identifies
5 that the physical subsector is unused.

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7 17. A computer-readable medium having computer-executable instructions for
8 performing steps comprising:

9 receiving file system data;

10 storing the file system data in a plurality of reserved sectors within a non-
11 volatile memory;

12 compressing the file system data stored within in the plurality of reserved
13 sectors to create a compressed data block; and

14 storing the compressed data block in at least one physical subsector within
15 the non-volatile memory.

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17 18. The computer-readable medium as recited in Claim 17, wherein receiving
18 file system data further includes presenting an operating system with a plurality of
19 operatively accessible virtual sectors resulting in a virtual memory capacity that
20 exceeds the actual physical capacity of the non-volatile memory.

1 19. The computer-readable medium as recited in Claim 18, wherein storing the
2 compressed data block at least one physical subsector within the non-volatile
3 memory further includes mapping the plurality of virtual sectors to at least one
4 physical subsector through a Virtual Sector Table (VST) stored in a volatile
5 memory and presenting the operating system with the VST.

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7 20. The computer-readable medium as recited in Claim 19, wherein mapping
8 the plurality of virtual sectors to at least one physical subsector through the Virtual
9 Sector Table (VST) further includes providing a Sector Allocation Table (SAT)
10 within the volatile memory, the SAT mapping the physical subsectors to the VST.

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12 21. The computer-readable medium as recited in Claim 20, wherein providing a
13 Sector Allocation Table (SAT) within the volatile memory further includes
14 generating the SAT based at least on a unique group identifier that is stored in each
15 physical subsector associated with storing the compressed data block.

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17 22. The computer-readable medium as recited in Claim 21, wherein the Sector
18 Allocation Table (SAT) is generated during a device initialization time.

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20 23. The computer-readable medium as recited in Claim 17, wherein storing the
21 compressed data block in at least one physical subsector within the non-volatile
22 memory further includes associating each physical subsector with a unique group
23 identifier.

1 24. The computer-readable medium as recited in Claim 23, wherein storing the
2 compressed data block in at least one physical subsector within the non-volatile
3 memory further includes writing each physical subsector associated with the
4 compressed data block to the non-volatile memory in an a sequential order, but not
5 necessarily a contiguous order.

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7 25. The computer-readable medium as recited in Claim 17, wherein storing the
8 compressed data block in at least one physical subsector within the non-volatile
9 memory further includes associating a first physical subsector with at least one
10 virtual sector identifier.

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12 26. The computer-readable medium as recited in Claim 17, wherein storing the
13 compressed data block in at least one physical subsector within the non-volatile
14 memory further includes, maintaining input/output (I/O) operation status
15 information within the non-volatile memory during on-going I/O operations.

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17 27. The computer-readable medium as recited in Claim 17, wherein the non-
18 volatile memory further includes a raw sector map configured to identify a
19 plurality of reserved sectors within the non-volatile memory.

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21 28. The computer-readable medium as recited in Claim 27, wherein the non-
22 volatile memory further includes an input/output (I/O) operation status area that
23 identifies the status of on-going I/O operations with respect to data stored within
24 non-volatile memory.

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1 29. The computer-readable medium as recited in Claim 27, wherein the non-
2 volatile memory further includes a plurality of contiguously arranged reserved
3 sectors.

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5 30. The computer-readable medium as recited in Claim 27, wherein the non-
6 volatile memory further includes a plurality of contiguously arranged physical
7 subsectors.

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9 31. The computer-readable medium as recited in Claim 30, wherein each of the
10 physical subsectors includes a first portion that includes a group identifier.

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12 32. The computer-readable medium as recited in Claim 30, wherein the group
13 identifier identifies that the physical subsector is unused.

14
15 33. An arrangement for use in providing an application access a non-volatile
16 memory, the arrangement comprising:

17 an operating system; and

18 a device driver, wherein the operating system is configured to exchange
19 input/output (I/O) requests with the application and exchange corresponding file
20 system requests with the device driver, and wherein the device driver is configured
21 to store the file system data received from the operating system in a plurality of
22 reserved sectors within the non-volatile memory, compress the file system data
23 stored within in the plurality of reserved sectors to create a compressed data block,
24 and store the compressed data block in at least one physical subsector within the
25 non-volatile memory.

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2 34. The arrangement as recited in Claim 33, wherein the device driver is further
3 configured to present the operating system with a plurality of operatively
4 accessible virtual sectors resulting in a virtual memory capacity that exceeds the
5 actual physical capacity of the non-volatile memory.

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7 35. The arrangement as recited in Claim 34, wherein the device driver is further
8 configured to map the plurality of virtual sectors to at least one physical subsector
9 through a Virtual Sector Table (VST) stored in a volatile memory and present the
10 operating system with the VST.

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12 36. The arrangement as recited in Claim 35, wherein the device driver is further
13 configured to store a Sector Allocation Table (SAT) within the volatile memory,
14 the SAT mapping the physical subsectors to the VST.

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16 37. The arrangement as recited in Claim 36, wherein the device driver is further
17 configured to generate the SAT based at least on a unique group identifier that is
18 stored in each physical subsector associated with storing the compressed data
19 block.

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21 38. The arrangement as recited in Claim 37, wherein the device driver is further
22 configured to generate the Sector Allocation Table (SAT) during a device
23 initialization time.

1 39. The arrangement as recited in Claim 33, wherein the device driver is further
2 configured to associate each physical subsector with a unique group identifier.

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4 40. The arrangement as recited in Claim 39, wherein the device driver is further
5 configured to write each physical subsector associated with the compressed data
6 block to the non-volatile memory in an a sequential order, but not necessarily a
7 contiguous order.

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9 41. The arrangement as recited in Claim 33, wherein the device driver is further
10 configured to associate a first physical subsector with at least one virtual sector
11 identifier.

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13 42. The arrangement as recited in Claim 33, wherein the device driver is further
14 configured to maintain input/output (I/O) operation status information within the
15 non-volatile memory during on-going I/O operations.

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17 43. The arrangement as recited in Claim 33, further comprising:
18 a processor configured to run the operating system and the device driver;
19 and
20 a non-volatile memory operatively coupled to the processor.

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22 44. The arrangement as recited in Claim 43, wherein the processor and non-
23 volatile memory are part of a set top box.
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1 45. A non-volatile computer-readable medium having stored thereon a data
2 structure, comprising:

3 raw sector map data;

4 a plurality of raw sectors as identified in the raw sector map that are
5 configurable to store uncompressed data during input/output (I/O) operations;

6 I/O operation status data identifying on-going I/O operations; and

7 a plurality of subsectors contiguously arranged and configured to support
8 the identified on-going I/O operations by storing compressed data blocks derived
9 from the uncompressed data.

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11 ^{46.}
^{47.} 46. The non-volatile computer-readable medium of Claim ⁴⁵46, wherein each of
12 the plurality of subsectors further includes a group identifier that is uniquely
13 associated with the associated compressed data block.